

What is claimed is:

1. A transmitter, comprising:

a multi-signal generator for providing a plurality of signals within a selected frequency band and having a center frequency and relative frequency spacing, wherein

said center frequency is selectively adjusted to cover at least a portion of the selected frequency band;

a modulator connected to said multi-signal generator for selectively and simultaneously modulating said plurality of signals; and

a control unit for selectively controlling at least one of said multi-signal generator center frequency and relative frequency spacing.

2. The transmitter of claim 1, wherein said multi-signal generator further includes a wave memory for reproducing a selected waveform output signal providing said plurality of signals.

3. The transmitter of claim 2, wherein said wave memory output signal comprises a plurality of signals corresponding to a different portion of said selected band.

4. The transmitter of claim 3, wherein said control unit provides prestored waveforms selectively transferred to said wave memory to provide said plurality of signals on a corresponding portion of said selected band.

1 5. The transmitter of claim 2, further including a waveform  
2 converter connected to receive said reproduced selected waveform  
3 output signal and provide a converted output signal.

1 6. The transmitter of claim 5, further including an audio source  
2 comprising one of an audio memory for providing a prestored audio  
3 signal selected by said control unit, and a microphone, said audio  
4 source being selectively connected to said converter to therein  
5 amplitude modulate the waveform output signal.

1 7. The transmitter of claim 2, further including a programmable  
2 signal generator providing a programmable output signal and a mixer  
3 receiving said programmable output signal and said converted output  
4 signal and providing a mixer output therefrom, wherein said  
5 programmable output signal is selectively varied to provide a  
6 plurality of signals at different portions of a selected band.

1 8. The transmitter of claim 7, wherein said programmable signal  
2 generator is controlled by said control unit to selectively provide  
3 different output signals, which when received by said mixer,  
4 provides said plurality of signals corresponding to substantially  
5 all of said selected frequency band.

1 9. The transmitter of claim 8 further including a frequency  
2 modulator connected to said programmable signal generator for

frequency modulating the output signal thereof according to an audio signal.

10. The transmitter of claim 9 further including an audio source comprising one of an audio memory for providing a prestored audio signal selected by said control unit, and a microphone, said audio source being selectively connected to said frequency modulator to modulate programmable signal generator output signal.

11. The transmitter of claim 10, further including an audio source comprising one of an audio memory for providing a prestored audio signal selected by said control unit, and a microphone, said audio source being selectively connected to said frequency modulator.

12. The transmitter of claim 7, further including a power amplifier selectively receiving from one of said mixer output signal and said converted signal, and providing a transmitter output signal.

13. A dual-mode transmitter, comprising:

a first signal generator for simultaneously providing a plurality of signals within a frequency band and having a relative frequency spacing, and including an amplitude modulator of said plurality of said plurality of signals according to a modulation signal;

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7 a second signal generator for selectively providing a  
8 selectable frequency signal, and including a frequency modulator of  
9 said selectable frequency according to a modulation signal;

10 a mixer receiving the output signals of said first and second  
11 signal generators, and providing an output signal;

12 a power amplifier for selectively receiving said signals  
13 corresponding to said plurality of signals from said first signal  
14 generator and said mixer output signal, providing a signal to an  
15 antenna according to said selectively received signal; and

16 a control means for selectably enabling said first signal  
amplitude modulator in a first mode, and said second signal  
generator frequency modulator in a second mode.

14. The transmitter of claim 13, further comprising an audio  
source comprising one of an audio memory for providing a prestored  
audio signal selected by said control unit, and a microphone, said  
audio source being selectively connected to said amplitude  
modulator and said frequency modulator.

1 15. The transmitter of claim 13, wherein said first signal  
2 generator comprises means for providing a plurality of signals in  
3 selected portions of said frequency band according to said control  
4 unit wherein said selected portions substantially comprise said  
5 frequency band.

1 16. The transmitter of claim 13, wherein said first signal

2 generator comprises means for providing a plurality of signals in  
3 at least one selected portion of said frequency band according to  
4 said control unit, and

5 said second signal generator provides said selectable  
6 frequency signal according to said control unit,

7 wherein said mixer output signals comprise selected  
8 portions which substantially comprise said frequency band.

1 17. A method of providing simultaneous multi-carrier transmission,  
2 comprising the steps of:

3 selecting a set of carrier frequencies;

4 providing a corresponding sum of sine wave signals each  
5 corresponding to one of the set of carrier frequencies;

6 dividing the sum into a number of segments in the time domain;

7 calculating a variance of the magnitudes of each said segment;

8 changing the phase relationship of said sine wave signals to  
9 minimize the variance;

10 repeating the steps of calculating and changing until the  
11 minimization of the variance from said changes is less than a  
12 desired threshold significance value; and

13 transmitting a signal corresponding to said sum of said sine  
14 wave signals.

1 18. The method of claim 17, wherein said step of changing  
2 comprises the step of randomly changing the phase relationship of  
3 said sine wave signals.

1 19. The method of claim 17, wherein said step of selecting a set  
2 of carrier frequencies comprises the step of selecting a set of  
3 carrier frequencies corresponding to allocated broadcast channels  
4 within a selected broadcast band.

1 20. The method of claim 19, wherein said selected broadcast band  
2 comprises at least one of commercial AM and FM broadcast band.

1 21. The method of claim 11, further including the step of  
2 modulating said signal corresponding to the sum of said sine wave  
3 signals.  
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1 22. The method of claim 11, further including the step of  
2 frequency translating said signal corresponding to the sum of said  
3 sine wave signals into at least a portion of a selected broadcast  
4 band.